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NASA Finds Traffic Isn't There

Shuttle Albatross Spews Hemorrhage of Red Ink

Dyspeptic Senator Jake Garn did his bit for NASA by starring in the extraterrestrial circus that's regularly staged to rouse public support for a bloated space program. But no amount of orbital entertainment can obscure the growing economic scandal of the Space Shuttle—over-priced, oversold, underused, and too elephantine to compete for launch sales with a cheap European upstart.

As grist for the video-age, the visually spectacular Shuttle has defied the hard rules of jaded taste to command precious TV time through 17 flights. The aura of success is there, boosted by an anxious NASA and its clinging industrial contractors. But the disparity between promise and performance is also spectacular (See box page 3).

In the early 1970s, when the space establishment touted the concept of a reusable spacecraft as a logical, and relatively thrifty, follow-on to the Apollo moonlanding, skeptics wondered where the payloads would come from to fill its mammoth cargo bay. NASA responded that commercial, military, and scientific payloads would easily require 5 orbiters. In 1977, 4 years before the first Shuttle flight, NASA confidently projected a Shuttle schedule totaling 572 flights between 1980 and 1991. At a charge per flight of $38 million, NASA then said, the Shuttle would actually turn a profit.

By 1980, NASA's traffic estimates for 1980-91 had dropped to 487. Its latest forecast is for 165 flights, at a cost of $71 million each until 1989, when the price goes to $87 million (all figures in comparable inflation-adjusted dollars).

Even if the Shuttle were able to maintain the old American monopoly on non-Soviet delivery services to space, that long-ago forecast of 572 flights would still be make-believe, since there's no cargo on hand or in sight to fill that many Shuttle flights. But the Shuttle is no longer the West's exclusive truck to space, for Europe is now in the space-launch business, and it's there with a cheap and simple rocket, the Ariane, produced by the 11-nation European Space Agency.

The gold-plated American space enterprise once scoffed at Ariane as a relic of NASA technology of the late 1960s and 1970s—and so it is, plain and simple, a modernized version of the trusty expendable rockets of pre-Shuttle vintage. But, as the non-partisan Congressional Budget Office recently pointed out in a gloomy assessment of Shuttle economics, while Ariane initially sought one-third of non-Communist payload business, "it now carries close to 40 percent of recent commercial launches, thanks to aggressive pricing and continued technical improvements."

Meanwhile, the Shuttle's spotty record for getting off the ground on schedule has provided the Air Force with

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Alarms About Science Fraud Get Some Respectful Notice

Los Angeles. Recent, well-publicized episodes of scientific fraud have generally been discounted by the research establishment as aberrational acts of individual malefactors. They've been seen as titillating for the press and public, but surely not a symptom of something systematically wrong with the ways of science.

However, a shift of perception seems to be taking place within the ranks of mainstream science. According to a panel of journal editors and senior administrators and researchers here last month at the annual meeting of the American Association for the Advancement of Science, the high ethical standards routinely professed by science are losing out in the high-stakes competition for publication, tenure, and research grants. While blockbuster cases of scientific fraud may be rare, they suggested, there's an increased incidence and tolerance of "lesser" offenses, such as scientifically useless multiple publication of the same data, overblown claims for trivial findings, and phony co-authorship. And there's also no little amount of plain faking of research results, some panelists said.

Robert Petersdorf, Dean of the medical school and Vice Chancellor for Health Sciences, UC San Diego,

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In Brief

Reagan and Science Adviser Keyworth said it should, and basic research is now getting the lion's share of federal R&D money on campus, according to NSF's latest figures. The share for basic science now totals two-thirds of the federal R&D money going to universities; in 1975, it got half.

Meanwhile, Federal support is down for arms-control and international studies, but private funds, mainly from big foundations, are up sharply—from $16 million in 1982 to $52 million last year, according to the Forum Institute, a Washington research and information service.

. . . The Case of the Non-Existent Co-Authors

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flailed contemporary science as "too big, too competitive, too entrepreneurial, too bent on winning." Petersdorf attributed research fraud to a culture that begins with the "pre-med syndrome," citing a recent poll of 400 medical students, of whom 88 percent admitted cheating at least once as undergraduates; he noted that many agreed with the statement "people have to cheat in this dog-eat-dog world."

Petersdorf went on to tell a horror story—villain unidentified—of a 33-year-old faculty member, top of his class as an undergrad and medical student, trained in 2 specialties, co-author of 118 papers. While he was being considered for a professorship, a senior researcher noticed that the control groups in several of his studies appeared to be the same. Suspicious, he made inquiries, which revealed that the "co-authors" in these "experiments" had no knowledge of the papers.

Proceeding to check out the prospective appointee, Petersdorf reported, the researcher could find no record of the animals supposedly used in the experiments. The grants that were supposed to have supported the experiments were insufficient to cover the cost of the animals, even if they had been ordered. Data books were not to be found.

Petersdorf said the young man resigned in favor of the fallback position often taken by fraudulent physician-researchers—he took up the practice of medicine.

Edward Huth, editor of the *Annals of Internal Medicine,* said he was more concerned about abuses of the traditional rules of scientific publication than he was about outright fakery, which he termed rare. "False authorship," frequently a bonus for principal investigators and department heads, is, in Huth's view, a serious threat to the integrity of scientific publication. Sometimes it's not even sought but is sycophantically bestowed by junior researchers currying favor, he said.

Huth also denounced "salami science"—slicing up a study into as many "least-publishable units" as possible. The practice, he said, needlessly consumes the time of editors, reviewers, and readers, as well as scarce and expensive journal space. But it's hard to stop, he said. "When a single piece of work is chopped into 2 or more papers, they are usually written and submitted to different journals about the same time."

A related trick, he continued, is repetitive publication, often aided by what he called "meat extenders"—filler that makes the paper look different the second time around. Noting that authors have resorted to tinkering with titles to achieve multiple publications from a given piece of research—replacing "pulmonary" with "lung," for example—Huth warned that the practice can create dangerous distortions. For example, he said, surveys of adverse drug reaction reports can be skewed by repetitive reports.

Huth's journal requires authors to sign a form affirming that they have seen and approve of the submitted manuscript. In one case, he said, suspicions were aroused when a "co-author" didn't know he was a co-author. A check of signatures on the required forms revealed that the signatures of all 8 authors bore a striking calligraphic similarity.

"Expanded Definition of Fraud"

John C. Bailar III, Statistical Consultant for the *New England Journal of Medicine,* said there's a need for an "expanded definition of fraud" to cope with authors who use inappropriate statistical methods to exaggerate the significance of their data. And Marcia Angell, Deputy Editor of the *Journal,* pointed out that editors cannot be expected to sift out all fraudulent papers, nor is the peer-review system, she said, an infallible screen. Perhaps the time has come, she suggested, for grant-making agencies and tenure committees to refuse to consider more than the 3 papers that an applicant selects as his best in any given year.

Establishment of that rule might prove disruptive in some quarters. As reported by another member of the panel, Patricia Woolf, of Princeton University, although the number of papers per author has changed little in recent years, the number of superprolific authors has increased sharply. A survey of chemists at 3 of the largest chemistry departments in the country, she said, found the average of publications, 11 apiece, al-

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Shuttle Cost Rise, Traffic Drop Traced in Congressional Study

From "Space Shuttle 1977: Status Report," published December 1976 by the House Committee on Science and Technology:

In reviewing the cost, performance and schedule of the Space Shuttle, it is important to keep in mind the NASA dollar commitments to Congress for the development program at the time the program was approved:

A. $5.22 billion (1971 dollars) for the total development program.

B. $300 million (1971 dollars) total for NASA facilities required to support the Shuttle Program.

C. $10.5 million (1971 dollars) for the average "out-of-pocket" costs for each Shuttle flight at a rate of 60 flights per year.

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From "Pricing Options for the Space Shuttle," a "Special Study" by the Congressional Budget Office (CBO), published March 1985:

As unforeseen technical problems developed, the Shuttle Program met neither its cost nor flight-rate goals. By 1980, NASA's estimates of the number of flights through 1991 had fallen from 572 to 487, and in combination with design changes and inaccurate cost estimates, this drove the per flight cost up by 73 percent. NASA now estimates that the demand for the Shuttle from 1980 through 1991 will be only 165 flights, or 30 percent of the 1977 estimate. The flight rate continues to be a key uncertainty because both the physical capability of the Shuttle fleet to fly 24 times a year and the existence of sufficient demand to require 24 flights have been questioned . . . .

In 1977, 4 years before the first flight and 6 years before the Shuttle entered commercial operations, NASA issued its first pricing policy for Shuttle launch services . . . . The base price of $38 million [converted by the CBO to 1982 dollars] per flight and additional user fees and insurance charges established at that time covered flights from 1983 through 1985 . . . . In 1986, a higher, Phase II price of $71 million per flight will take effect. This price, however, reflects only part of the system's operating costs and none of its capital depreciation. NASA has recently proposed a Phase III pricing policy for launches from 1989 through 1991, which will raise the per flight price to $87 million. This third price is projected to cover operational costs only . . . .

Before fiscal 1983, the nation invested $17.8 billion in development and testing of the Shuttle system. For the first 3 years of operations, fiscal years 1983 through 1985, an additional $10.5 billion will be spent . . . . For the next 5 years . . . spending of $10.4 billion is projected.

Shuttle

(Continued from page 1)

still another argument for running its own space program, including a California carbon copy of NASA's Shuttle launch facility in Florida.

Desperate for arguments to justify this all-time technological extravaganza, NASA proudly cites heroic repairs in space that have revived faulty satellites worth hundreds of millions of dollars. Omitted from this pro-Shuttle propaganda is that no amount of such savings can approach the nearly $40 billion so far expended on the Shuttle's design, construction, and operations. Manufacturing in the zero-gravity of space—another sales argument for the Shuttle—may indeed pan out, but high-tech industry remains generally cool to the proposition.

As showbiz, the Shuttle is a winner, the vehicle into space for the first American woman, first Senator, first black space pilot, and soon to come, the first school teacher.

What encores may be in the works? Ballet troupe? Rodeo rider (with horse)? Childbirth?

The horizons are endless in space.—DSG

Fraud

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most unchanged since 1957.

But, she pointed out, where only 1 or 2 chemists per department were publishing 20 or more papers a year in 1967, there are now 13—out of a total of 50 professors in all 3 departments—publishing papers at that rate.

The AAAS panel on scientific fraud merely corroborated, with the addition of some fine details, common observation and reports in the rumor mill. The setting and the stature of the panel participants add credibility to the contention that science's traditional review techniques do not provide the policing required for maintaining the integrity of the enterprise. As is becoming increasingly evident, monumental fraud is not the problem. It is careerist hustling and intellectual cornercutting that are contaminating the profession.

Space Station, Unlike Star Wars, Moves Smoothly

While disputes rage over the wisdom and practicality of the Strategic Defense Initiative (SDI), another colossal technological enterprise has been progressing with relatively little attention. It's the permanently manned space station, first publicly proposed 18 months ago by President Reagan, and scheduled—if all goes well politically and technically—to enter orbit around 1994. According to present plans, it would accommodate a crew of 8 and support a host of scientific operations, including materials processing, the life sciences, astronomy, and remote sensing

The space station and SDI are organized as separate ventures, with the former assigned to NASA, while SDI, or Star Wars, belongs to the Defense Department. SDI's destiny and costs are extremely vague—beyond the $26 billion sought for R&D over the next five years—while the space station comes with a $12 billion price tag for design and construction. But little is certain about either of these space extravaganzas. Cost estimates for such high-tech novelties are infamously untrustworthy. And, given the serpentine boundaries that exist between military and civilian space capabilities, it would indeed be foolish to regard SDI and the space station as endeavors permanently remote from each other. They are growing up together, even if they are managed by separate bureaucracies.

NASA's Managerial Role

Preliminary design work on the space station has been going on for several hope-filled years at NASA, but during the past few months the pace has quickened considerably. Four NASA centers and 8 teams of engineering contractors are now involved, with the present timetable calling for development and construction to begin next summer—assuming an expected go-ahead from the White House and Congress.

For NASA, the challenge will be more managerial than technical. Industrial contractors will do the actual development and construction. But in a departure from its past pattern of operations, the space agency has assigned itself the role of day-to-day manager of the overall operation. In the Apollo and Space Shuttle programs, that task was filled by Rockwell, leaving NASA to monitor the ventures from a distance. Does NASA have the managerial prowess required to integrate the separate elements of this vast undertaking? There are doubters.

The international element is another source of uncertainty. Following President Reagan's invitation to other countries to participate in the design of the station, the 11-nation European Space Agency (ESA), Japan, and Canada have been weighing the possibilities and pros and cons of collaboration. The most tangible results so far are memorandums of understanding with NASA on swapping design data and keeping in touch on technical problems over the next year or so.

But, as the time gets closer for the US to move from design to development and construction, the potential foreign partners will have to make up their minds about the extent and conditions of their involvement. Assuming that all the countries decide to take part in some way or other—which is not unlikely—NASA will be faced with not merely looking after the US segment of the program, but also with trying to incorporate the varying interests and capabilities of 13 other countries.

$150 Million for Design

Only then is it likely that major expenditures will be made. So far, Congress has given NASA $150 million for design studies. ESA is spending some $50 million, and Japan and Canada are putting up something less than that. As for the total sums for the space station, President Reagan has spoken of $8 billion in US funds spread over a decade, while the Europeans are thinking about a $2-billion laboratory, called Columbus, that would plug into the central core of the station. Japan has in mind a similar sum for a similar laboratory, while Canada has tentatively earmarked some $300 million for a series of robot modules for repair and maintenance of the station.

The NASA centers (Johnson, Texas; Marshall, Alabama; Lewis, Ohio, and Goddard, Maryland) are working with 8 contracting teams to refine the reference design produced for NASA last year during a 2-month "skunk-works" operation conducted by 200 engineers crammed into a rented building in Houston. The reference design calls for a series of laboratory and accommodation units to be strung out in space along a metal beam some 100 meters long. A "power tower" would serve as a base for logistics cannisters and other units containing supplies and equipment ferried from earth. Also tethered to the beam would be docking bases for scientific instruments, satellites and shuttling service units, which would attend the station every 3 months.

Preliminary designs for the crew's living accommodations suggest borrowings from enlightened studies of prison architecture. According to plans at the Johnson Center, each astronaut would be given a cabin, or cell, measuring some 1 meter by 1 meter by 2 meters. The walls would be made of panels of light alloys or fabric, allowing for simple alterations in interior decoration. Each crew member would have an individual computer

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. . . Foreign Invitees Fear US Data Restrictions

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for work, as well as an entertainment terminal. NASA is having discussions with Nautilus, the manufacturer of physical fitness machines, about the development of exercise apparatus tailored to zero-gravity.

The space agency is also working on new forms of dishwashers, laundry equipment, toilets, and showers. Apart from the 3 Skylab flights of the early 1970s, no US space mission has lasted more than about a fortnight. Thus, there has been little incentive to replicate high-style plumbing in space, as was evident from a barely functioning shower on the Skylabs and repeated toilet troubles aboard the, mercifully, short Shuttle flights. The plumbing past is summed up as follows by Chris Perner, head of the Manned Space Division at the Johnson Space Center: "So far, going into space has been like taking a camping trip."

Toilet design is shaping up as a particularly challenging problem. The aim is to introduce a closed-cycle system which will maximize the recycling of waste products. On all previous US space trips, fecal matter and urine were stored; the Soviets usually dump the stuff overboard in containers known as "honey pots," which, along with everything else in space, are meticulously tracked by the US Air Force.

With the space station planning on crew tours of 3 months, and the costs of storage room shaming even Manhattan real estate prices, the designers aim to recycle urine and extract useful substances from fecal matter. The engineers recognize that earthbound sensitivities might affect customer satisfaction and they expect that crew counseling will be part of the system.

Though substantial foreign participation seems to be in the cards, a great deal remains to be settled before the other nations come into the construction phase. France and several European countries want assurances that the US will share advanced technologies associated with the space station's development. Their concerns on this score arise from fears that the White House, spurred by the Pentagon's hardliners, may seek to restrict fullscale collaboration to prevent leakage to the Soviets.

The 13 countries and the US are also looking into formulas for allocating the running costs of the space station—a difficult task, since at this point, no one has anything but a vague idea of what the costs might be. A multi-national partnership would also have to agree on a legal framework to safeguard corporate and individual commercial rights.

Finally, the shadow of Star Wars hangs over the entire project. The Defense Department states that there's no connection between its missile-defense program and the space station—which it notes is a civilian undertaking and, it insists, of no military value. It's obvious, however, that both projects are dependent on many of the same technologies, among them propulsion, on-board power systems, computers, tracking, and materials. Aerospace firms such as Teledyne/Brown, Hughes, Rockwell, McDonnell Douglas, Boeing, and Lockheed will be heavily involved in both projects.

It is, of course, possible that no military use will be found for a permanently manned space station and that the project will sail on as a rare example of an advanced technology of no interest to the US or the Soviet armed forces. But precedents for that benign outcome are between rare and non-existent.—Peter Marsh

(The author, technology correspondent of the *Financial Times* of London, recently visited major American space centers.)

NIH Sets Biotech Conference

NIH has signed up a blue-ribbon collection of life sciences mandarins and researchers for a conference June 24-25 inspired by White House prodding to be attentive to the needs of the biotechnology industry (SGR Vol. XV, No. 8).

The meeting, sponsored by the Advisory Committee to the Director of NIH, will hear from Presidential Science Adviser George A. Keyworth, who has frequently said that NIH performs great research but isn't concerend with fostering an economic payoff. The NIH establishment is a bit horrified by the concept of industrial responsibilities, but is willing to look, at least to the extent of the Committee's June topic—"The NIH Role in Fostering the Nation's Leadership in Biotechnology."

The speakers include: Theodore Cooper and Ralph Christofferson, senior executives, Upjohn; Donald Kennedy, President, Stanford; Philip Leder, Chairman, Dept. of Genetics, Harvard Medical School; Richard Nesbit, Vice President, Beckman Instruments; Mark Pearson, Director, Molecular Biology, DuPont, and Donald Fredrickson, President, Hughes Medical Institute.

The Advisory Committee meetings are public, but because of limited space, overflow audience must view it on closed-circuit TV. For information: 301/496-3152.

House Task Force Examines R&D Facilities Issue

The chronic problem of money for university research facilities received a thorough going over May 21-22 before the Science Policy Task Force of the House Science and Technology Committee when a well-selected group of witnesses set forth the views of academe, industry, and government.

The hearings were successful for bringing out bedrock positions. Thus, academe repeated that it's sinking and desperately needs help; industry replied that universities manage poorly; the Administration's representative agreed with both, but said that industry and the universities themselves should provide more help—adding, significantly, that federal R&D priorities should be reoriented toward more spending on campus. Following are distillations of the testimony of 3 of the 8 witnesses at the hearings.

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Donald N. Langenberg, Chancellor, University of Illinois at Chicago: We have just completed an audit of all university buildings . . . . Fifty-six percent of the buildings on the Urbana campus and 44 percent of the total on both campuses are over 50 years old. The total cost to renovate the better buildings and to replace the worst is estimated at just under $600 million . . . . A considerable portion of these are research facilities. In summary, the University of Illinois has an immediate research-facilities deficit conservatively estimated at several hundred million dollars.

In the absence of a cohesive national effort, universities are attempting to address the capital deficit by a variety of means. Debt is mounting in many institutions as they borrow funds, use available bonding authorities, leverage available funds with other private and state funds, and cost-share with other institutions . . . . I believe most already are stretching their imaginations and resources to the prudent limit, and sometimes beyond.

A satisfactory solution lies beyond the capacity of almost all institutions. That broader effort must come from a well-conceived, well-coordinated national program led by the federal government . . . working throught its . . . major research agencies.

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Frank B. Sprow, Vice President, Exxon Research and Engineering Company: Many of us in industry are shocked when we experience the current state of many university laboratories . . . . The estimate of funds [by NSF of $1.3 billion per year needed for new facilities] is not surprising. My own company recently completed construction of a new laboratory . . . to provide state-of-the-art facilities for several hundred scientists. The cost of this facility was over $200 million, corresponding to over $300 per square foot of lab space . . . .

Indirect Roulette's Top 20

With even the skinflint Reagan Administration having given up attempts at control, indirect costs on federal research grants remain a computational mystery for which there is no explanation but academe's need for all it can get. The biggest provider of such funds is NIH, which, at the request of the House Appropriations Committee, drew up a list of its top 20 university grant recipients and their direct and indirect receipts. The list is included in the text of hearings held in March on the NIH budget for fiscal 1986. Copies are available from the US Government Printing Office or, better yet, your Congressman or Senator. (Ask for House Appropriations Hearings, Department of Labor, HHS, Education and Related Agencies, for 1986, NIH, Parts 4A and 4B.)

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Institution	Direct	Indirect	Total
	(dollars in thousands)		
Johns Hopkins	$49,561	$27,185	$76,746
UC San Francisco	57,126	14,521	71,647
Harvard	40,393	26,662	67,055
Yale	40,800	24,309	65,109
U. of Pennsylvania	33,533	18,477	52,010
Stanford	39,851	23,856	63,707
Columbia	36,314	23,908	60,222
U. of Washington	43,395	13,870	57,265
UCLA	40,893	14,849	55,742
Washington (St. L.)	32,496	15,106	47,602
Yeshiva	26,287	21,249	47,536
U. of Michigan	30,265	17,061	47,326
U. Wisconsin (Mad.)	33,400	12,882	46,282
U. of Minnesota	33,426	12,005	45,431
Duke	28,790	13,015	41,805
UC San Diego	30,855	9,544	40,399
U. of Chicago	23,674	14,582	38,256
Cornell	26,045	11,672	37,717
MIT	24,250	12,685	36,935
UC Berkeley	25,412	11,090	36,502
Totals	$696,766	$338,528	$1,035,294

What has often been overlooked in the discussion has been the need for better *systems* for managing, operating, sharing, and stewarding research resources. Management issues have largely been left unaddressed, due perhaps to our highly decentralized system of university research. It is time that we address them because there are abundant opportunities to both increase research output *and* efficiency . . . .

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. . . Shift R&D Funds to Academe, OSTP Aide Says

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The current project grant system . . . has in several ways adversely affected the maintenance of our research infrastructure, particularly in the area of instrumentation. The intense competition . . . has affected the funding allocation decisions of peer review committees, often leading to specific denial of funds for instrumentation . . . . It has led some investigators to defer acquisition of instrumentation in order to use limited funds to preserve scientific and support staff.

An alternative approach that would lend itself to greater utilization of business principles for managing our research resources would be the creation of a new Supplemental Institutional Equipment Grant to encourage the establishment of centralized facilities. Such facilities would be collaboratively managed by the institutions using them. As envisioned here, they would facilitate the acquisition, maintenance, and sharing of instrumentation . . . .

The concept of shared research facilities is already established in the field of physics [and] there are several successful university, industry, and government cooperative arrangements in operation today [in various other fields of research] . . . . Research is becoming so capital-intensive that proven business procedures and techniques must be used to ensure that our investments yield maximum scientific and technological return.

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Bernadine Healy, Deputy Director, White House Office of Science and Technology Policy: . . . the central question . . . is not so much what to do about the present condition of the university research infrastructure. The real question is more fundamental: Is the partnership among industry, government, and the universities functioning in a manner which ensures that the US will maintain a healthy, modern research infrastructure? . . . .

By the late 1970s, the universities warned that unless the government came up with new facilities funding, the research infrastructure was in trouble. Industry was making some contribution, but those were small compared to the benefits they derived from . . . the universities. The universities themselves behaved largely as dependents of the government, abdicating their responsibility for infrastructure and biding their time until federal facilities programs were resumed. And the government . . . attempted not to invest in the research enterprise, but to procure packets of research at the lowest possible price . . . .

Well, what should we do? Simply creating a new, multi-billion dollar facilities program may, over the near term, improve the condition of the infrastructure, but . . . it is equally important that change take place in the attitudes and performance of each of the three partners.

The government must focus on our research expenditures as *investing* in the research enterprise and not procuring research results. This means bearing the reasonable and necessary costs of the research it sponsors . . . .

. . . universities must assume a far more significant and responsible role in managing the nation's investment in university research . . . . I would like . . . to see a system in which the universities would be reimbursed realistically for facilities and equipment used in federally sponsored research and for the universities to take a leadership role in identifying cost savings associated with research overhead.

As for industry . . . . contributions of state-of-the-art research equipment, and industry-university cooperation in its use and maintanance, is one remedy for many weaknesses in the partnership. Unrestricted donations, as well as donations toward renovation or construction of new facilities, should also be encouraged . . . .

An increased federal commitment to university research is indeed an investment . . . that we probably can't get along without . . . . Yet, of the more than $20 billion [that the federal government spends] on civilian R&D, about $6 billion is invested in university research. This balance may be inappropriate to today's circumstances. Since the budget deficit forces us to select among competing priorities, I would suggest that we continue what we all began several years ago, and redirect civilian R&D funds from lower priority areas, particularly technology development projects, to the highest priority, university-based research.

US Engineers to Get Soviet R&D Literature

While the Administration continues to denigrate Soviet research and development as substantively unworthy of exchange efforts, the American Society of Mechanical Engineers (ASME) thinks otherwise. At the direction of its Council on Engineering, it has established a Russian Literature Awareness Subcommittee to evaluate books on engineering recently published in the Soviet Union and to translate those that are in demand.

The Subcommittee is chaired by William Begell, President of Hemisphere Publishing Company, New York. An ASME press release says that under a cooperative arrangement that he's worked out with the Soviet copyright agency, ASME will be provided with "lists, abstracts, and tables of contents of forthcoming Russian titles for evaluation."

The task of evaluating the Soviet materials will be under the supervision of a Russian-speaking editorial advisory board chaired by Eugene Riven, Professor of Mechanical Engineering, Wayne State University. The press release quotes Riven as saying that "The Soviet industrial system is very strong in research and has developed some very impressive methods, but is rather weak in commercial production. Soviet research results are very good," he added, "even in areas in which their products are not very good."

Estimating the Soviet output of engineering books at 1000-2000 a year, Riven stated, "The American engineering community is ignoring this valuable resource while the Soviet Union is quite successful in perusing all available US technical publications."

Abstracts produced by the advisory board will be published in *Mechanical Engineering*, a slick monthly publication of the 112,000-member ASME. According to the announcement, "readers will be encouraged to indicate their interest . . . and popular titles will be considered for full translation and publication in English."

The ASME's interest in Soviet engineering research contrasts with snotty remarks that senior Administration officials have frequently made about the quality of Soviet R&D. Presidential Science Adviser George A. Keyworth has on several occasions publicly stated that political considerations rather than technical substance should guide American policy on technical exchanges with the Soviets since, in his view, the Soviets have little or nothing to teach us about R&D. Similar views, but with more emphatic expression, have been offered by Richard N. Perle, the Pentagon's preeminent hardliner.

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